

Claims

1. A machine (5) for making and packaging articles (1) containing infusion product, the machine (5) being of the type defined by a production line (A) comprising a plurality of operating stations located one after the other and designed to make at least one continuous strip (S) by superposing and sealing two webs of filter paper with measured quantities or charges (4) of infusion product interposed between them at regular intervals; and at least one cutting station (6) for dividing up the strip (S) to form a succession of individual articles (1); the machine (5) being characterised in that it further comprises at least one built-in packaging station (8, 8a) for packaging groups of the articles (1) in bag-like packets (10); the built-in packaging station (8, 8a) being located immediately downstream of the cutting station (6) and comprising a packaging device (9) for making up stacks (1a, 1b) with the articles (1) and a transfer device (11) which guides the stacks (1a, 1b) of articles (1) along a vertical feed path section (Z) transversal to the production line (A) and feeds them into the bag-like packets (10).
2. The machine according to claim 1, characterised in that the packet (10) is formed on the transfer device (11) and positioned with its inlet opening (10a) at the lower end (11a) of the device (11) itself.
3. The machine according to claim 1 or 2, characterised in that the packaging device (9) comprises a carriage-like bucket (13) that moves to and from the guided transfer device (11); the carriage-like bucket (13) being equipped with at least one seat (14, 15) for receiving at least one of the stacks (1a, 1b) of articles (1).
4. The machine according to claim 3, characterised in that the carriage-like bucket (13) has an open bottom (13a) bounded by a circular ledge (16, 17) on which an article (1) forming the bottom of the stack (1a 1b) can be rested.
5. The machine according to claim 3, characterised in that the carriage-like bucket (13) has two adjacent seats (14, 15) for receiving two stacks (1a, 1b) of the articles (1); each of the

seats (14, 15) having an open bottom (13a, 13b) bounded by a circular ledge (16, 17) on which the article (1) forming the bottom of the respective stack (1a 1b) can be rested.

5 6. The machine according to claim 5, characterised in that the two seats (14, 15) in the carriage-like bucket (13) form, in cross section, a binocular-shaped profile open in the middle where the two seats (14, 15) meet and extending for the full height of the carriage-like bucket (13).

10 7. The machine according to any of the foregoing claims from 3 to 6, characterised in that a head end (13c) of the carriage-like bucket (13) has a through vertical opening (18) extending for the full height of the bucket (13) itself.

15 8. The machine according to any of the foregoing claims from 3 to 6, characterised in that each of the seats (14, 15) in the carriage-like bucket has a respective slot (14a, 15a) at the top of it to partially accommodate a part of means (27) for stabilising and stacking the articles (1).

20 9. The machine according to any of the foregoing claims from 1 to 8, characterised in that the packaging device (9) comprises a carriage-like bucket (13) equipped with actuating means (19) for moving it in both directions along a path (T) transversal to the article (1) vertical downfeed path section (Z) and to an article (1) stacking axis (Z1), thereby imparting reciprocating motion to the carriage-like bucket (13).

25 10. The machine according to claim 9, characterised in that the actuating means (19) consist of a rigid rod (19) attached to a rear end of the carriage-like bucket (13) and slidably driven along the transversal path (T).

30 11. The machine according to claim 9 or 10, characterised in that the actuating means (19) position at least one of the seats (14, 15) under the packaging station (8).

12. The machine according to any of the foregoing claims from 1 to 11, characterised in that it comprises two adjacent stations (8, 8a) for simultaneously packaging the articles (1).

35 13. The machine according to any of the foregoing claims from 1 to 12, characterised in that it further comprises a fixed, rigid table (20) located at the stacking area below the base of the

packaging device (9) and forming a temporary base; the table (20) having at its free end a through opening (21) to match the shape, and allow the passage of, a base plate (26).

14. The machine according to any of the foregoing claims from 1 to 13, characterised in that the packaging station (8, 8a) comprises: a pair of vertically sliding, pre-stacking levers (22) acting at a vertical stacking channel (23) defined by four vertical guides (24); a second carriage (25), which moves vertically, interacting with the pair of levers (22), and which has a base plate (26) and an upper retaining fork (27) acting in the stacking channel (23) to receive the predetermined number of stacked articles (1) from the pair of levers (22) and to complete a stack (1a, 1b) of articles (1) in such a way as to place the stack (1a, 1b) in the packaging device (9).

15. The machine according to claim 14, characterised in that the levers (22) are positioned opposite each other on both sides of the channel (23) and are mobile between a working position in which the levers (22) are close together and engage the channel (23) in such a way as to support the articles (1) in the channel (23), and an idle position in which the levers (22) are apart in such a way as to enable the articles (1) to move down rapidly; the pair of levers (22) being linked to a third, power-driven carriage (28) mobile vertically in such a way as to enable the levers (22) to move downwards gradually when they are in the working position and to move up rapidly when they are in the idle position.

16. The machine according to claim 14 or 15, characterised in that the second carriage (25) faces the pair of levers (22) on the opposite side of the channel (23); the plate (26) that supports the articles (1) being located at the bottom end of the carriage (25) and being associated with the free end of a C-shaped supporting pin (26a) protruding laterally from the second carriage (25) in such a way as to enable the plate (26) to be positioned at the centre of the channel (23) but passing through the side of the channel (23).

17. The machine according to one of the foregoing claims from 14 to 16, characterised in that the retaining fork (27) of the second

carriage (25) is positioned at the front of the channel (23) and can move into the channel (23) itself; the fork (27) being pivoted to the second carriage (25) at (F27) and can move between an idle position in which the fork (27) is positioned at an angle outside the channel (23), and a working position in which the fork (27) is positioned inside the channel (23) and holds the stack (1a, 1b) of articles (1) in place at least until the pods (1) are placed in the packaging device (9).

18. The machine according to one of the foregoing claims from 14 to 17, characterised in that the second carriage (25) is equipped with drive means (29) that move in step with the third carriage (28) along a stacking axis (Z1) in such a way as to permit the following steps to be performed: stacking of a first group or partial quantity of articles (1) on the pair of levers (22) as the latter are being moved down vertically in the working position; lifting the plate (26) to position it under the pair of levers (22) when the first partial quantity of articles (1) is stacked; resting the articles (1) on the plate (26), with the pair of levers (22) in the idle position; then moving the pair levers (22) up again; completing the stack of articles (1) in the predetermined quantity on the plate (26) as the latter moves down and the fork (27) moves to the working position on the topmost article (1) of the stack; and placing the stack (1a, 1b) of articles (1) in the packaging device (9).

19. The machine according to any of the foregoing claims from 1 to 18, characterised in that the transfer device (11) comprises guide and controlled downfeed means (12) which in turn comprise: a vertical channel (30) formed by a hollow element (31); the channel (30) having at least one zone (32, 33) for the passage of the articles (1); an element (34) for pushing/accompanying the articles (1), which is positioned above the hollow element (31) and which is vertically mobile between an idle end position where the element (34) is away from the opening at the top of the hollow element (31), so as to enable the packaging device (9) to be positioned at said top opening, and a working end position where the element (34) guides and pushes the articles (1), sliding along

the inside of the channel (30) so as to position the articles (1) in the bag-like packet (10).

20. The machine according to claim 19, characterised in that the cross-sectional profile of the channel (30) defines two adjacent
5 circular zones (32, 33) for the simultaneous guided downfeed of two stacks (1a, 1b) of articles (1).

21. The machine according to claim 20, characterised in that the two circular zones (32, 33) for access by the article (1) stacks (1a, 1b) have a diameter (D) that is smaller than the maximum
10 dimension (D1) of the articles (1) so as to control and guide the articles (1) as they are pushed down along the channel (30).

22. The machine according to claims 20 and 21, characterised in that the hollow element (31) is equipped with a longitudinal conduit (35) for conveying a fluid positioned centrally between
15 the two circular zones (32, 33), and leading into at least one bottom opening (36) through which the fluid itself is fed into the hollow element (31), in such a way as to blow the fluid on the articles (1) as they move down along the channel (30).

23. The machine according to claim 22, characterised in that the
20 fluid is nitrogen.

24. The machine according to claims 19 to 23, characterised in that each of the circular zones (32, 33) of the hollow element (31) has radial grooves (38) around its circumference extending for the full length of the circular zones (32, 33).

25. The machine according to one of the foregoing claims from 19 to 24, characterised in that the pushing/accompanying element (34) comprises a flat head (34a) designed to come into contact with the
25 articles (1) so as to push and guide the articles (1) down the zones (32, 33).

26. The machine according to claim 25, characterised in that the flat head (34a) is associated with a vertical rod (39) that slides along guides (40) associated with a vertical column (41) located above the hollow element (31); the rod (39) being driven by a variable-speed motor (42) positioned at the top end of the column
30 (41).

27. The machine according to one of the foregoing claims from 19 to 26, characterised in that at the lower end of the hollow

element (31), there is a sealing and cutting unit (43) designed to close the inlet opening (10a) of the bag-like packet (10) positioned under the hollow element (31) and to simultaneously form the base (10b) of the next packet (10) being formed around
5 the hollow element (31).